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(71) Applicant *(for all designated States except US)*: MADDLE CO., LTD [KR/KR]; 1F Sports Plaza Building, 28 Ogum-dong, Songpa-gu, Kangnam-gu, Seoul 135-120 (KR).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: LEE, Woo-Gi [KR/KR]; 147-2 San, Anyang 8-dong, Manan-gu, Anyang-shi, Kyonggi-do 430-742 (KR).

(74) Agent: JUNG, Won-Ki; Hankook Building, 8th floor, 831-3, Yeoksam-dong, Kangnam-ku, Seoul 135-080 (KR).

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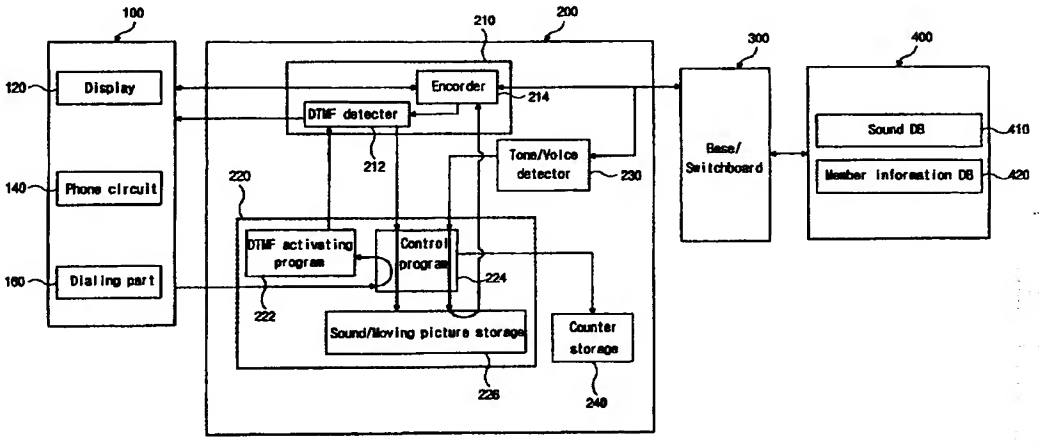
[Continued on next page]

(54) Title: METHOD OF CHANGING TELEPHONE SIGNALS



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(57) Abstract: The present invention relates to a system of converting phone signals, which has a signal converter. In order to provide the system of converting telephone signals including a ring back tone signal, a busy tone signal and a network busy tone signal to a sound and/or a moving picture including an advertisement, a music, a message, or an English conversation, disclosed is a system comprising: a user terminal outputting the sound and/or moving pictures including the advertisement, the music, the message or the English conversation instead of the telephone signal including the ring back tone signal, the busy tone signal, and the network busy tone signal; a server providing the sound an/or the moving picture including the advertisement, the music, the message and the English conversation; a signal converter that stores the sound and/or the moving picture including the advertisement, the music, the message or the English conversation provided by the server, detects the telephone signal including the ring back tone signal, the busy tone signal and network busy tone signal, and converts the detected telephone signal to the sound and/or the moving picture in order to transmit to the user terminal.

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METHOD OF CHANGING TELEPHONE SIGNALS

[TECHNICAL FIELD OF THE INVENTION]

The present invention relates to a method of changing telephone signals, and more particularly, to a method of converting the telephone signals to sounds and/or moving picture or display. The telephone signals include the ring back tone signal, the busy tone signal, the network busy tone signal and so on. The sounds or moving picture include advertisement, music, a message, and an English conversation.

[CONVENTIONAL ART OF THE INVENTION]

In general, when users or senders dial the telephone, the sending signal are converted to a digital signal and transmitted to a switchboard, which applies the calling current to the receiver. Then, the receiver responds to the switchboard in the form of ring back tone signal, busy tone signal, network busy tone signal, and so on. And then when a hook-off signal is transmitted to the switchboard, the talking passage is established between the sender and the receiver. At this point, the switchboard transmits the ring back tone, the busy ton, or network busy tone signals to the sender, and sender can detect the state of the receiver using the transmitted signals.

And in case of mobile phone, if sender pushes the desired telephone number and push a talking button or sending button, a wireless talking passage with a

And in case of mobile phone, if sender pushes the desired telephone number and push a talking button or sending button, a wireless talking passage with a communication base is established. Then a ring back tone signal or a busy tone signal is transmitted to the sender, as described above.

Meanwhile, in case of a conventional PSTN telephone or a mobile phone, sending sound or ring back tone is so simple, monotonous and boring, thus the time of receiving the sending signal is wasted for nothing.

[DETAILED DESCRIPTION OF INVENTION]

The present invention aims to solve the above-mentioned problem. The object of the present invention is to provide a method of conversing a ring back tone signal, a busy tone signal, and network busy tone signal which are simple and monotonous to a sound and/or moving picture including an advertisement, a music, a message or an English conversation.

In order to achieve the object, the present invention provides a telephone signal conversion system of conversing telephone signals including a ring back tone signal, a busy tone signal and a network busy tone signal to a sound and/or a moving picture including an advertisement, a music, a message, or an English conversation, comprising, a user terminal outputting the sound and/or moving picture including the advertisement, the music, the message or the English conversation instead of the telephone signal including the ring back tone signal, the busy tone signal, and the network busy tone signal; a server providing the sound and/or the moving picture including the advertisement, the music, the message and the English conversation; a signal converter that stores the sound and/or the moving picture including the

advertisement, the music, the message or the English conversation provided by the server, detects the telephone signal including the ring back tone signal, the busy tone signal and network busy tone signal, and converts the detected telephone signal to the sound and/or the moving picture in order to transmit to the user terminal.

The signal converter further comprises an apparatus for analyzing or reconstructing sound, a nonvolatile memory, and an apparatus for discerning the sound and the tone. The nonvolatile memory includes a control program, a DTMF activating program, a sound and/or a moving picture storage. The apparatus of analyzing and reconstructing sound is comprised of an encoder and DTMF detector. The signal converter further comprises a counter that counts a number of establishing talking passage to the user terminal when the sound and/or the moving picture is an advertisement.

The present invention further provides a method of converting telephone signal, comprising: a first step that a sender dials a desired telephone number to a receiver; a second step that the receiver responds to the dialing in a form of a predetermined signal; a third step that detects the signal transmitted from the receiver; and a fourth step that selects one of sounds and/or moving pictures including an advertisement, a music, a message and an English conversation.

The signal transmitted from the receiver includes a ring back tone, a busy tone signal, a network busy tone signal or congestion signal. The third step further comprises a step of determining whether the signal from the receiver is ring back tone signal.

If the signal from the receiver is not the ring back tone, the first step further comprises a step of storing the desired telephone number, and the third step further comprises a step of redialing the desired telephone.

The third step further includes a step of checking number of dialing and a step of stopping the output of the sound and/or the moving picture by limiting the number of dialing. If the signal from the receiver is a ring back tone, the third step further includes a step of determining whether the receiver is Hook-Off. When the receiver is Hook-Off, the third step further comprises a step of stopping the output of the sound and/or the moving picture.

[BRIEF EXPLANATION OF FIGS]

FIG. 1 is a block diagram illustrating a telephone signal conversion system according to a preferred embodiment of the invention.

FIG. 2 is a flow chart illustrating a step of storing aimed sounds including an advertisement, music, a message and an English conversion data in a user terminal from the ARS server according to the preferred embodiment of the invention.

FIG. 3 is a flow chart illustrating a method of converting telephone signals according to the embodiment of the present invention.

FIG. 4 shows an internet server according to the embodiment of the inventio.

[THE BEST MODE FOR INVENTION]

Hereinafter, referring to the attached drawings, preferred embodiments of the present invention are explained in detail.

FIG. 1 is a block diagram illustrating a telephone signal conversion system according to a preferred embodiment of the invention. As shown in Fig. 1, a telephone signal converting system according to an embodiment of the invention includes a user terminal 100, a signal converter 200, a communication base 300, and ARS (automatic response service) server 400. The user terminal 100 can be a mobile phone or a PSTN phone usually used at home or at offices, or at streets. The phone can include a function of accessing Internet in wire/wireless form. When the user terminal has that function, the ARS server 400 can be an Internet server as shown in Fig. 4. Further, the user terminal 100 and the signal converter 200 can be formed in a body.

The user terminal 100 includes a dialing part 160 that transmits a telephone number or other information of the receiver's terminal (not shown) or the ARS server 400 to the communication base 300 in the form of DTMF (Dual Tone Multi-Frequency) signal or dialing packet by the inputting of keypad (not shown), a telephone circuit part 140 having a function of sending/receiving dialogue and a function of control, and a display part 120 for displaying a character information of the inputted keypad or displaying a moving picture information.

The signal converter 200 includes a Vocoder 210 that analizing or reconstructing sounds, a nonvolatile memory or flash memory 220, a tone/voice detector 220 that can discern voice from tones such as ring back tone, a busy tone or a congestion tone, and a counter storage 240.

The Vocoder 210 has a DTMF detector 21 that detects a DTMF signal between the ARS server 400 and the user terminal 100, and has an encoder 214 that converts the voice in the form of analogue into a digitized signal and vice versa.

The flash memory 220 has a DTMF activating program 222 that activates a DTMF signal detecting mode, a control program 224 that controls all the elements fo the signal converter 200, and a sound/moving picture storage 226 that stores sound information and/or moving information such as advertisements, music, messages or English conversation.

The counter storage 240 has a counter information that the counter value increases when a talking passage is established between the receiver and the sender in case that the sounds and/or moving pictures stored in the flash memory 220 include advertisements, music, messages or English conversation and so on. That is, the counter storage 240 increases the value of counter when the control program 224 of the flash memory 220 confirms the selection of the advertisement and establishment of the dialogue between the receiver and the sender.

The tone/voice detector 230 distinguishes between the human voice and the telephone tone transmitted from the switchboard. The phone tone can be essentially detected by a signal transmitted before the ring back tone, the busy tone, and the hook off signal are transmitted. Additionally, the method of distinguishing between phone tone and voice is further processed using software.

The method of using software is explained. The packet of phone tone and/or voice is coded to a packet using the Vocoder 210 that is a voice change/compress algorithm used in QCELP (Qualcomn Code Excited Linear Prediction) for CDMA systems and/or EVRC (Enhanced Variable Rate Coder) for a cellular phone service. The phone tone and/or voice packet coded by the Vocoder 210 and transmitted to the communication base 300 has a vector quantization value, a pitch parameter, and a format parameter. The packet can be decoded into about 160 PCM samples, which are

in crowds within a certain frequency group in case of tone packet, thus which is distinguished from the voice packet. Also, by approximating the frequency elements of the receiving packet, the voice and tone can be distinguished. And since the ring back tone or the busy tone is iterated with a certain interrupt ringing tone, the detection of voice and the tone can be accomplished by checking the interrupt ringing tone. For example, tone standard of a government shows that the ring back tone has ON time of one second and OFF time of two second, and that a trunk busy signal that is a busy signal of transmitting lines has ON time of 0.3 second and OFF time of 0.2 second. At this time, while the signal is the ring back tone, a predetermined sound stored in advance is transmitted to a speaker, and if the signal is not the ring back tone, the transmission is normally processed.

The ARS server 400 is a generally known automatic response system, and has a sound source database 410 having sound sources of advertisements, music, messages or English conversations, and a member information database 420 having information of users. The ARS server 400 can be an Internet server 500, which is a generally known Internet server and has a sound source database 510 having sound sources of advertisements, music, messages or English conversations, and a member information database 520 having information of users. Therefore, when a user of the user terminal 100, who is registered as a member of the ARS server 400 or the Internet server 500, contacts the ARS server 400 or the Internet server 500 in order to use the sound and/or moving picture including advertisement, music, messages or English conversation instead of the ring back tone, busy tone and congestion signals, the ARS server 400 or the Internet server 500 checks the information of the users and transmits sound and/or moving picture that the user required to the user terminal 100.

The information of the users stored in the member information database 420 includes a general information of the users such as telephone numbers, identification numbers, addresses, passwords, a summary information of the sound and/or moving pictures that a user uses through the ARS server 400 or the Internet server 500, and a counter value information that has a counted number of the sound and/or moving picture used by the user, when the sound and/or moving pictures are advertisements.

Fig. 2 is a flow chart illustrating a method of storing sounds and/or moving pictures including advertisements, music, messages or English conversation in the user terminal 100 instead of sending sounds of telephone. First, the method of storing sound and/or moving pictures in the user terminal 100 is explained. As shown in Fig. 2, when a talking passage between the ARS server 400 and the user terminal 100 is established by the ARS server 400 or by the user terminal 100 (S1), the control program 224 in the flash memory 220 of the signal converter 200 drives the DTMF activating program 222 to activate the DTMF detecting mode of the DTMF detector 212. Thus, the ARS server 400 and the user terminal 100 can communicate with each other using the DTMF command codes. Then the ARS server 400 sends a guide message that requires selecting one of the sounds that the user wishes to store, a sample sound with the DTMF command codes. In response to the messages, the user sends a DTMF command code that includes an information of the selected sound such as advertisements, music, messages or English conversation (S2). In response to this, the ARS server 400 starts to record the sound with sending a DTMF command code, which notifies the start of the record, to the user terminal 100. After completing the record, a DTMF command code that notifies the end of the record is sent and the

selected sound is stored in the sound/moving picture storage 226 of the signal converter 200 (S3).

At this time, the counter information storage 240 stored in EEPROM of the signal converter 200 has an information of the numbers of the advertisements that the user heard. It is transmitted to and stored in the member information database 420 by a DTMF command code that requires transmission of the counter information at the same with the transmission of the selected sounds. After that, the counter storage 240 is initialized (S5).

The DTMF command code can be formed in various types. For example, for the DTMF command code, "1, 2, 3, 4, 5, 6, 7, 8, 9, 0, #, and so on" can do, or any combination of frequencies can do, too. In other words, when the DTMF command code of the ARS server, which requests a selection of the advertisement sound, is "#1", the response DTMF command code of the user terminal 100 can be "*1". Also, when the DTMF command code of the ARS server 400, which requests a selection of one of music, message and English conversation information sounds is "#2", the response DTMF command code of the user terminal 100 can be "*2". The DTMF codes of the ARS server 400, which notify starting and completing storing of the selected sound can be "#3" and "#4", respectively, and at this time the user terminal 100 can be informed that the storing of the selected sound is completed through the code "#4". The DTMF command code of the ARS server 400, which requests a counter information, can be "#*", and the responding DTMF command code of the user terminal 100 can be "*#XXX". At this point, "XXX" is a counter information and it's notation is decimal scale. For example, if the counter information is "1", then the code has "001", and if "100", then "100". The data structure of transmitting the

selected sound is "Flag1(DTMF1) + selected sound+Flag2(DTMF2)". Therefore, if Flag1(DTMF1) is detected by the user terminal 100, the storing of the selected sound in the sound/moving picture storage 226 within the flash memory 220 of the signature converter 200 is started, and if the Flag2(DTMF) is detected, the storing of the selected sound is ended.

The method of storing the sounds including advertisements, music, messages or English conversation and so on in the user terminal 100 explained above can be changed. If the user terminal 100 can be operable in the Internet mode, the method of storing the sounds including advertisements, music, messages or English conversation and so on in the user terminal 100 from the sound/moving picture database 510 of the Internet server 500 can be changed. At this time, sound and/or moving picture data can be downloaded through an Internet browser, instead of using the DTMF command codes or frequency combination as explained above.

Fig. 3 is a flow chart illustrating a converting method of the phone signals according to a preferred embodiment of the invention. First, when a user inputs a phone number of the receiver terminal (not shown) or other information into the user terminal, dialing part 160 of the user terminal 100 transmits in the form of DTMF command code or dialing packets to the switchboard 300 through the Vocoder 210 of the signal converter 200 (Sa1), the control program 224 of the flash memory 300 of the signal converter 200 detects the dialing signal and stores the phone number of the receiver terminal temporarily at a position of the flash memory 220 (Sa2). At this time, the control program (224) part can recognize the sending state through the tone/voice detector 230 of the signal converter 200, and through the control program 224 orders outputting of the selected sound in the sound/moving picture storage 226 in order that

the user can hear it (Sa3). At this time, if a moving picture having a sound is selected, the moving picture is output in the display 120 of the user terminal 100. The switchboard 300 that transmitted the DTMF command code or dialing packets from the dialing part 160 of the user terminal 100 checks the talking state of the receiver terminal. At this time, the signal responded to from the receiver terminal can be a ring back tone, a busy tone, or a congestion signals.

The tone/voice detector 230 of the signal converter 200 checks the signals from the receiver terminal (Sa4), and if the detected signal is a ring back tone signal, the switchboard 300 sends a ringing tone signal to the receiver terminal and checks the Hook-Off (Sa5). At this time, if the receiver terminal is not in a state of Hook-Off, the control program part 224 of the flash memory 220 of the signal converter 200 orders the sound/moving picture storage 226 of the flash memory 220 of the signal converter 200 to successively output the selected sound signal. And the tone/voice detector 230 of the signal converter 200 continuously detects the signal from the switchboard 300, if it is not the ring back tone signal, the control program part 224 checks the number of dialing (Sa7). If the number is more than 2 (two), the talking state is released, and if below 2 (two), redialing is processed using the temporarily stored phone number (Sa 2). Meanwhile, if in the fifth step (Sa5) the Hook-Off is established, a talking passage between the user terminal 100 and the receiver terminal is established through the phone circuit part 140 of the user terminal 100, and if the sound and/or the moving picture outputted instead of the phone signal is an advertisement, the counter value increases by "1(one)" and is stored in the counter storage 240 of the signal converter 200 (Sa6). At this time the numbers of the dialing to be checked can be adjusted by the user.

In other words, when the user terminal 100 tries to communicate, the tone/voice detector 230 of the signal converter 200 is operated, and the tone/voice detector 230 detects the signal from the switchboard 300 whether it is a tone or a voice. If it is a tone, the sound and the moving picture stored in the sound/moving picture storage 226 of the flash memory 220 is sent to the encoder 214 of the Vocoder 210 of the signal converter 200, which transmits the sound and the moving picture to the display of the user terminal 100 instead of the tone. At this time, the tone/voice detector 230 continuously detects the electric wave from the communication base 300, and at an instant when the voice is detected instead of the tone, the sound/moving picture transmission is ended by the control program 224, and the electric wave from the communication base 300 is no more detected and sent directly to the encoder 214 of the Vocoder 210.

Meanwhile, the communication between the signal converter 200 and the switchboard 300 can be processed using a wire such as a cable or using a wireless method as in the mobile phone. When a wireless method is used, the signal converter 200 can further include a sending/receiving part which can send or receive the signal between the signal converter 200 and the switchboard 300 using a certain method such as radio frequency signal method.

Further, the signal converter 200 can be assembled with the user terminal 100 in a body or it can be connected to the user terminal 100 using a port or a socket.

More further, though the embodiment of the invention provides a method of converting all the phone signals such as a ring back tone, a busy tone and a congestion signals to sound and/or moving picture selected by user such as advertisement, music,

messages or English conversation, each of the phone signal of the ring back tone, the busy tone or congestion signals can be separately serviced.

[INDUSTRIAL APPLICABLITY]

Due to the method of converting sending sound of the phone according to the invention, the time of waiting the communcation state can not be wasted by providing a more effective, melodious sound or moving picture in a various forms instead of simple and monotonous transmitted signal of the phone. Further, advertisement providers can maximize the effect of the advertisement through one to one advertisement and the users can receive benefits of discount of phone fare by hearing or watching the advertisement.

The ordinary man skilled in the art may know that the embodiment of the invention is only example and various changes and modifications can be made without departing the spirit of the invention. For example, the phone signal can be converted to a still picture or character instead of the sound and/or the moving picture.

[RANGE OF CLAIMS]

[CLAIM 1]

A telephone signal conversion system of conversing telephone signals including a ring back tone signal, a busy tone signal and a network busy tone signal to a sound and/or a moving picture including an advertisement, a music, a message, or an English conversation, comprising:

a user terminal outputting the sound and/or moving picture including the advertisement, the music, the message or the English conversation instead of the telephone signal including the ring back tone signal, the busy tone signal, and the network busy tone signal;

a server providing the sound and/or the moving picture including the advertisement, the music, the message and the English conversation; and

a signal converter that stores the sound and/or the moving picture including the advertisement, the music, the message or the English conversation provided by the server, detects the telephone signal including the ring back tone signal, the busy tone signal and network busy tone signal, and converts the detected telephone signal to the sound and/or the moving picture in order to transmit to the user terminal.

The present invention further provides a method of converting telephone signal, comprising: a first step that a sender dials a desired telephone number to a receiver; a second step that the receiver responds to the dialing in a form of a predetermined signal; a third step that detects the signal transmitted from the receiver; and a fourth step that selects one of sounds and/or moving pictures including an advertisement, a music, a message and an English conversation.

The signal transmitted from the receiver includes a ring back tone, a busy tone signal, a network busy tone signal or congestion signal. The third step further comprises a step of determining whether the signal from the receiver is ring back tone signal.

If the signal from the receiver is not the ring back tone, the first step further comprises a step of storing the desired telephone number, and the third step further comprises a step of redialing the desired telephone.

The third step further includes a step of checking number of dialing and a step of stopping the output of the sound and/or the moving picture by limiting the number of dialing. If the signal from the receiver is a ring back tone, the third step further includes a step of determining whether the receiver is Hook-Off. When the receiver is Hook-Off, the third step further comprises a step of stopping the output of the sound and/or the moving picture.

[CLAIM 2]

The system according to claim 1, wherein the signal converter further comprises an apparatus for analyzing or reconstructing sound, a nonvolatile memory, and an apparatus for discerning the sound and the tone.

[CLAIM 3]

The system according to claim 2, wherein the nonvolatile memory includes a control program, a DTMF activating program, and a sound and/or a moving picture storages.

[CLAIM 4]

The system according to claim 2, wherein the apparatus of analyzing and reconstructing sound is comprised of an encoder and a DTMF detector.

[CLAIM 5]

The system according to claim 3, wherein the signal converter further comprises a counter that counts a number of establishing talking passage to the user terminal when the sound and/or the moving picture is an advertisement.

[CLAIM 6]

A method of converting telephone signal, comprising:

a first step that a sender dials a desired telephone number to a receiver;

a second step that the receiver responds to the dialing in a form of a predetermined signal;

a third step that detects the signal transmitted from the receiver; and

a fourth step that selects one of sounds and/or moving pictures including an advertisement, a music, a message and an English conversation.

[CLAIM 7]

The method according to claim 6, wherein the signal transmitted from the receiver includes a ring back tone signal, a busy tone signal, a network busy tone signal or congestion signal.

[CLAIM 8]

The method according to claim 7, wherein the third step further comprises a step of determining whether the signal from the receiver is a ring back tone signal.

[CLAIM 9]

The method according to claim 8, wherein, if the signal from the receiver is not the ring back tone, the first step further comprises a step of storing the desired telephone number, and the third step further comprises a step of redialing the desired telephone.

[CLAIM 10]

The method according to claim 9, wherein the third step further includes a step of checking number of dialing and a step of stopping the output of the sound and/or the moving picture by limiting the number of dialing.

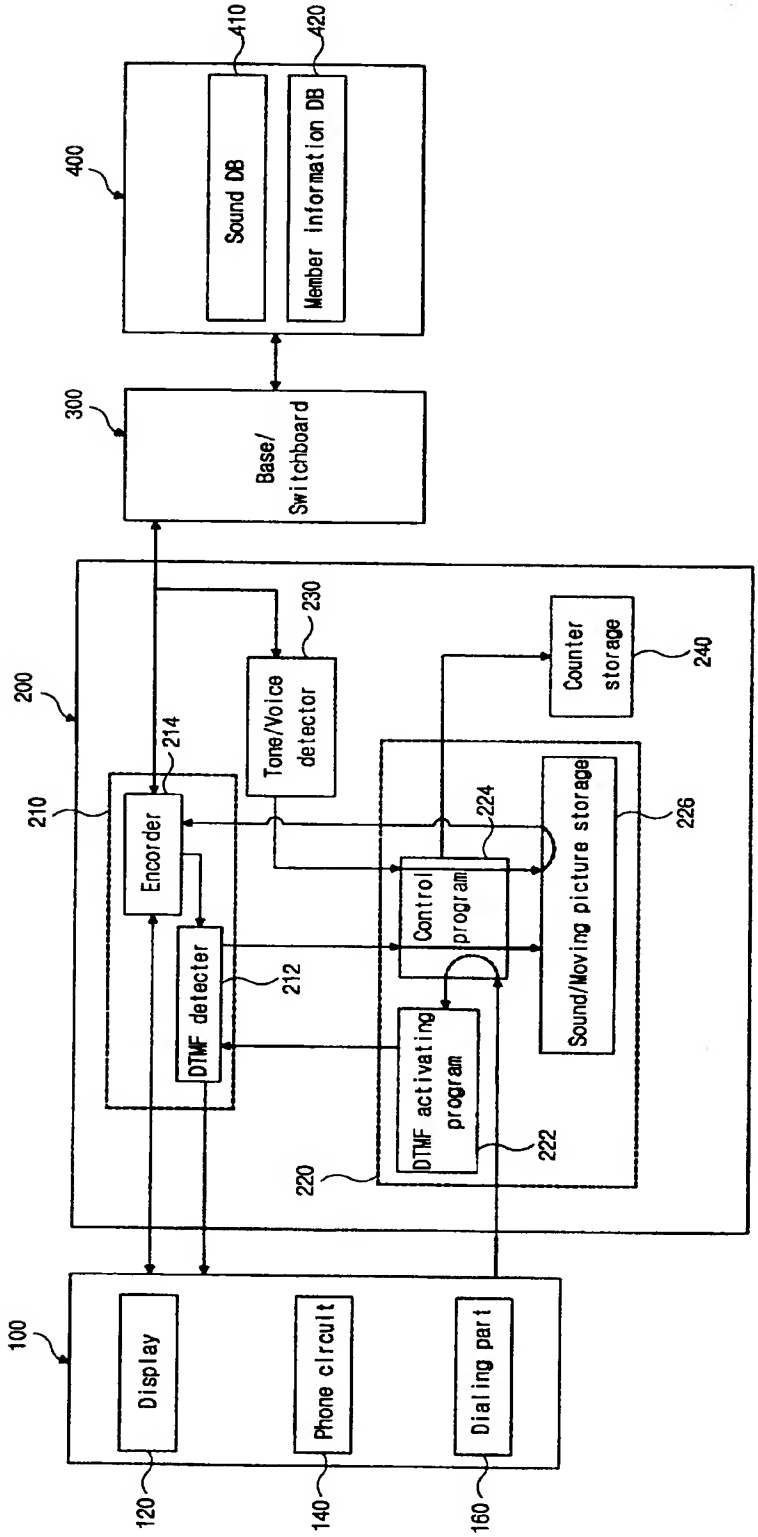
[CLAIM 11]

The method according to claim 8, wherein, if the signal from the receiver is a ring back tone, a step of detecting whether the receiver is Hook-Off is further included.

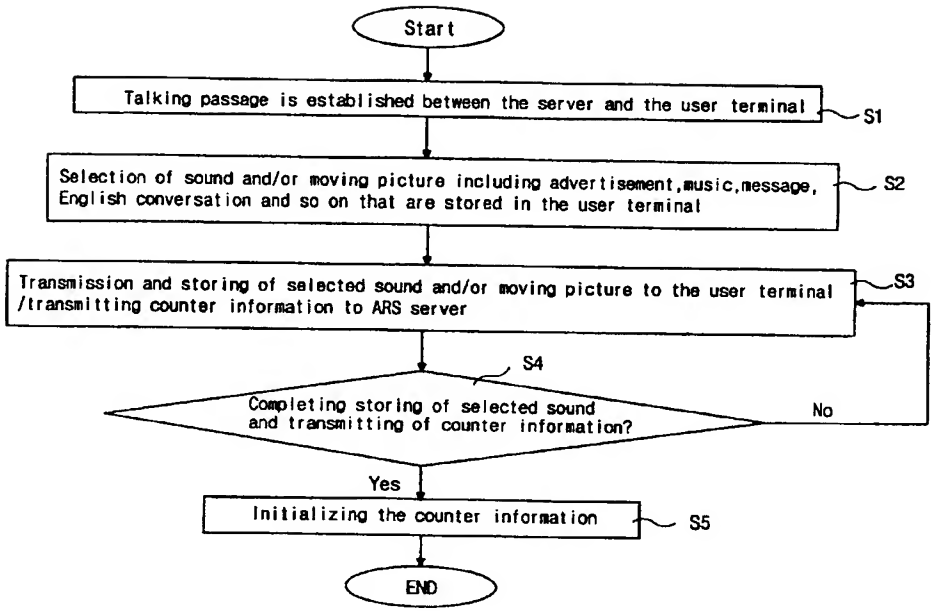
[CLAIM 12]

The method according to claim 11, wherein, when the receiver is Hook-Off, a step of stopping the output of the sound and/or the moving picture is further included.

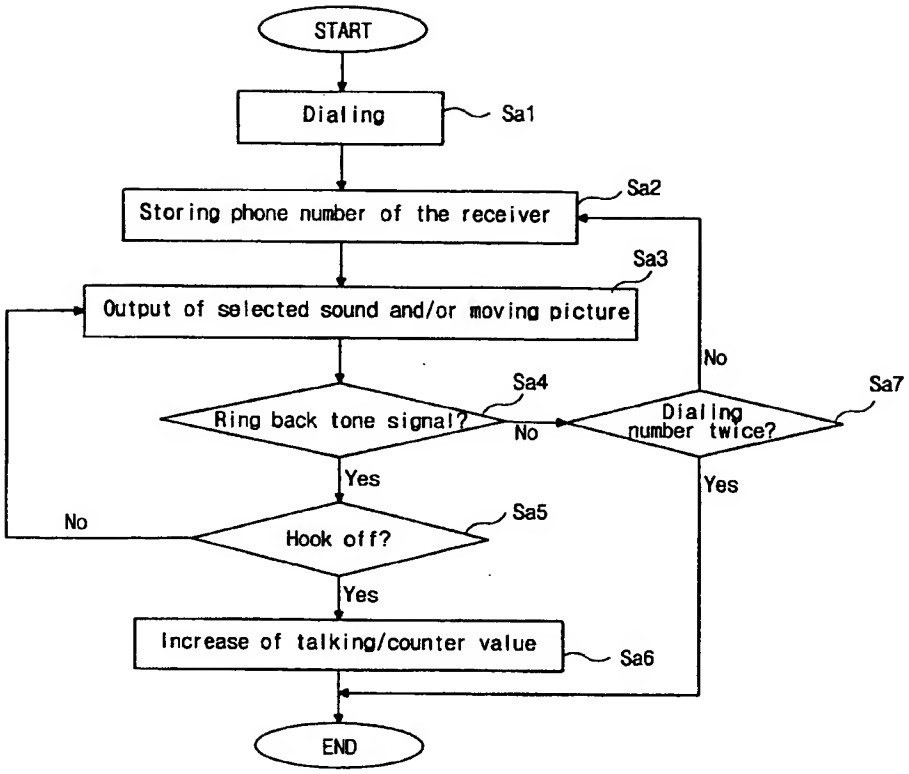
[FIG. 1]


410
420
400
Sound DB
Member information DB
300
Base/
Switchboard
200
230
Tone/Voice
detector
Counter
storage
240
214
210
Encorder
224
226
Control
program
Sound/Moving picture storage
DTMF detecter
212
DTMF activating
program
222
220
100
Display
Phone circuit
Dialing part
120
140
160

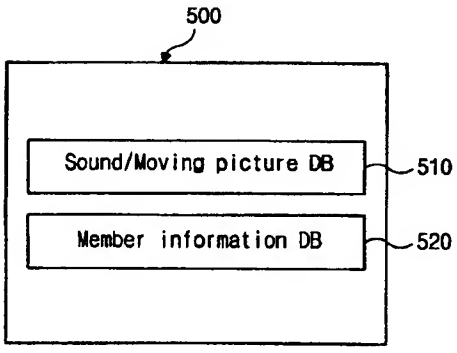
[FIG. 2]


Start
Talking passage is established between the server and the user terminal
S1
Selection of sound and/or moving picture including advertisement,music,message, English conversation and so on that are stored in the user terminal
S2
Transmission and storing of selected sound and/or moving picture to the user terminal /transmitting counter information to ARS server
S3
S4
Completing storing of selected sound and transmitting of counter information?
No
Yes
Initializing the counter information
S5
END

[FIG. 3]


START
Dialing
Sa1
Storing phone number of the receiver
Sa2
Sa3
Output of selected sound and/or moving picture
Ring back tone signal?
Sa4
No
Dialing number twice?
Sa7
No
Yes
Yes
No
Hook off?
Sa5
Yes
Increase of talking/counter value
Sa6
END

[FIG. 4]


500
Sound/Moving picture DB
510
Member information DB
520

INTERNATIONAL SEARCH REPORT

...ternational application No.
PCT/KR00/01320

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 H04M 3/42

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimun documentation searched (classification system followed by classification symbols)

IPC7 H04B1/06; H04B 7/26; H04M3/42; H04M11/02; H04M19/02

Documentation searched other than minimun documentation to the extent that such documents are included in the fileds searched

Korean Patent and applications since 1972

Electronic data base consulted during the intertnational search (name of data base and, where practicable, search trerms used)

WPI, JAPIO, DERWENT, USPTO

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	KR 2000-36415 A(EDTEC ELECTRIC COMMUNICATION CO. LTD) 5. JUL 2000 SEE ABSTRACT AND CLAIM1	1-18
Y	KR 2000-30442 A(IDEA PARK CO. LTD) 5.JUN 2000 SEE ABSTRACT	1-18
A	US 04,480,153 A (FESTA LAWRENCE M.) 30 OCT 1984 SEE PAGE1 LINE 25-67 AND FIGURE 2	1-18
A	JP 08,256,081 A (KOKUSAI ELECTRIC CO. LTD) 1. OCT 1996 SEE ABSTRACT	1-18

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:

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Date of the actual completion of the international search	Date of mailing of the international search report
27 MARCH 2001 (27.03.2001)	28 MARCH 2001 (28.03.2001)

Name and mailing address of the ISA/KR	Authorized officer
Korean Industrial Property Office Government Complex-Taejon, Dunsan-dong, So-ku, Taejon Metropolitan City 302-701, Republic of Korea Facsimile No. 82-42-472-7140	MA, Jung Youn Telephone No. 82-42-481-5703

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